

EXHIBIT C

USWeb/CKS

WALGREEN CO.***PHARMACY PHASE II:******DATABASE MANAGEMENT SYSTEM INTEGRATION***

Submitted By Tony Rems

Submitted To: George Riedl
Director, New Business Development
Walgreen Company
Deerfield, IL

Dated: July 1, 1999

Notice: The enclosed material is proprietary to USWeb/CKS. This material is presented for the purpose of evaluating services and may not be disclosed in any manner to anyone other than the addressee and employees or authorized representatives of Walgreen Co.

Contributors

Lauren Ayer
Senior Technical Writer

Dee Hardin
Technical Writer

Michael Poon
Engineer

Tony Rems
Managing Architect

Shelby Thornton
Managing Architect

Table of Contents

1. Introduction	1
2. Database Management Software—Oracle8i	2
2.1.1 Database Configuration	2
2.1.2 Database Links	2
2.1.3 PL/SQL	3
2.1.4 SQLJ	3
3. Data Replication	4
3.1 Intercom Plus	4
3.1.1 Patient Data	4
3.1.2 Drug Information	5
3.1.3 Store Data	6
3.2 Medispan	7
3.2.1 Drug Data	7
3.2.2 Drug Images	7
4. ATG E-Commerce Station	8
4.1 Registration (User Profile)	8
4.1.1 Third Party Insurance	10
4.2 Product Catalog	10
4.3 Order Data	11
4.3.1 New Prescriptions Orders	11
4.3.2 Rx Refill Orders	12
4.4 RX Refill Transfers	13
4.5 Order Status	13
5. Store Locator	16
Appendix A. Table Definitions	18
WWW_Member Table	18
WWW_Member_List Table	18
WWW_Home_Addr Table	19
WWW_Ship_Addr Table	19
WWW_Billing_Addr Table	19
WWW_Member_Health Table	19
WWW_Member_Allergies Table	19
WWW_Credit_Card Table	20
WWW_RX_Order Table	20
WWW_RX_Order_Detail Table	21
WWW_RX_Order_Status Table	21
WWW_RX_Order_Status_Detail Table	22
WWW_RX_Transfer Table	22
WWW_Stores Table	23

WWW_Store_Hours Table.....	23
WWW_Product Table	24
WWW_Product_Qty Table.....	24

List of Figures

Figure 1.	Member Profile Schema	9
Figure 2.	Prescription Order Schema	12
Figure 3.	Order Status DB Schema	15
Figure 4.	Store Info DB Schema Diagram	17

1. Introduction

Walgreen Co. has engaged USWeb/CKS to research, plan, specify, and develop a technical infrastructure to support their global World Wide Web Online Pharmacy efforts. These efforts include development, maintenance, hosting, and analysis in support of digital activities for marketing and sales of Walgreens pharmaceutical products. One component of this project is database implementation.

The software design for the ATG application server includes the complete database implementation for supporting both e-commerce and personalization. However, this design is meant to be the starting point for the development of a uniquely tailored implementation, specific to the requirements of the individual project.

This document details the Walgreens implementation-specific database design that will augment the ATG Application Server Database Schema. In particular, it defines the necessary tables and, where applicable, the synchronization facilities and procedures.

2. Database Management Software—Oracle8i

Oracle Corporation is the leading manufacturer of database software. Their database software is the current corporate standard at Walgreens. The latest release of the relational database product, Oracle8i, is designed specifically for the Internet market space.

Oracle8i is backward compatible with earlier releases of the product; specifically, previous versions of Oracle7 and Oracle8. This is extremely important for this implementation, as the key pharmacy systems integration is currently to an Oracle7 database.

Another advantage to Oracle8i is that it contains a complete Java Virtual Machine (JVM). Because the Walgreens Commerce Engine will be implemented primarily in Java, it will be possible, over time, to use Java to integrate many of the database administration tools and screens into the Oracle8i system.

2.1.1 Database Configuration

The Oracle database will be configured for OLTP transactions. During the applications development and performance-testing phase, USWeb/CKS expects to tune the INIT.ORA parameters and lay out the database again in its entirety.

The initial database parameters for development areas follows:

- DB_BLOCK_SIZE = 4096
- 4 - 10Mb Redo Logs
- 20 - 16K Rollback Segments
- 50Mb System Tablespace
- 100Mb Temporary Tablespace
- 400Mb Member Tablespace
- 600Mb Member Indexes Tablespace
- 400Mb Commerce Tablespace
- 600Mb Commerce Indexes Tablespace

2.1.2 Database Links

Oracle8i and earlier releases of the Oracle database product contains a facility referred to as Database Links, or DB Links. This connectivity feature allows an Oracle database to access another's tables transparently through SQL*Net.

The following syntax is used to create a database link:

```
CREATE [PUBLIC] DATABASE LINK link CONNECT TO user  
IDENTIFIED BY password USING 'connect_string'
```


The web database will make extensive use of this feature to create staging areas for data updates from Intercom Plus.

2.1.3 PL/SQL

PL/SQL is Oracle's proprietary, procedurally based SQL language for implementing store procedures and database triggers maintained centrally within the database.

Given Walgreens' hesitance to use PL/SQL and the compressed schedule for the pharmacy web site launch, there are no plans at this time to use PL/SQL procedures for the initial launch. This will in no way affect the functionality of the web site; however, PL/SQL might be revisited during development.

2.1.4 SQLJ

SQLJ is the Java-based implementation of SQL. Within Oracle, it allows Java/SQL procedures to be stored within the database and allows for simpler SQL coding within a Java application.

The industry is moving towards SQLJ as a standard; however, it is not yet a standard. As such, SQLJ will not be utilized for this implementation, but it might be used in a subsequent release.

3. Data Replication

Overall system performance is a key metric in the success of the Walgreens Online Pharmacy. As such, data that has a high degree of web access must be replicated closer to the applications for faster access.

This also will serve to reduce the additional load on the existing Walgreens systems while providing the most flexibility in the delivery of the data.

3.1 *Intercom Plus*

Intercom Plus is the Walgreens central data repository for pharmacy related patient information.

3.1.1 Patient Data

The patient data stored in Intercom Plus resides in the **TBF0_PATIENT** table. In order to associate the patient information residing in the web database with that residing within Intercom Plus, the unique identifier **PAT_ID** from the **TBF0_PATIENT** table will be used as a pseudo-foreign key.

The **TBF0_PATIENT** table attributes that will be replicated and synchronized on the web database are:

- PAT_FIRST_NAME
- PAT_MID_INIT
- PAT_LAST_NAME
- PAT_SURNAME_SUFFIX
- PAT_STREET_ADDR
- PAT_CITY
- PAT_STATE
- PAT_ZIP
- PAT_SEX_CD
- PAT_PRIM_AREA_CD
- PAT_PRIM_PHONE
- PAT_SNAP_CAP_PREF
- PAT_GENERIC_SUBS_PREF
- PAT_CC_NBR
- PAT_CC_EXP_DATE
- PAT_MAIL_SERVICE_ID

Data synchronization is mastered from the web site in such a way that there are no Intercom Plus changes required for this implementation. Any subsequent enhancements to Intercom Plus will not be pushed to the web site. In the event that a Intercom Plus enhancement needs to be reflected on the web site, it is the responsibility of the web development team to implement the replication and synchronization of this new data. This synchronization process is detailed later in this document.

3.1.2 Drug Information

Walgreens specific drug information is maintained within the **TBF0_DRUG** table within Intercom Plus. These drugs are referred to as "System Drugs" and will be used to populate the Product Data Catalog described later in this document.

The **TBF0_DRUG** table attributes that will be replicated and synchronized on the web database are:

- DRUG_ID
- PRODUCT_NAME_ABBR
- NDC_MFG
- NDC_PROD
- NDC_PKG
- DRUG_CLASS
- DRUG_STRENGTH
- DRUG_STRENGTH_UOM
- PRICING_QUANTITY
- PRICING_TYPE
- UPDATE_DTTM

To generate pricing information for the drugs in the Product Data Catalog, the PRICING_QUANTITY for each drug will be used and the appropriate Tuxedo function will be called to determine the price for display. This process will calculate and store the prices in the web database.

Pricing Update

Utilizing the UNIX Cron facility, the web site will check the following Intercom Plus tables daily via DB links for drug ids that have been updated for the purposes of price recalculation:

- **TBF0_DRUG**
- **TBF0_DRUG_PRICING_PAIR**
- **TBF0_DRUG_BLOCK_PRICING**
- **TBF0_DRUG_NONFORM_PRC**

Drugs fall into three pricing categories. If the PRICING_TYPE is equal to 7, the **TBF0_DRUG_PRICING_PAIR**, **TBF0_DRUG_BLOCK_PRICING**, and **TBF0_DRUG** tables will be queried for updated records. If the

PRICING_TYPE is equal to 2, the *TBF0_DRUG_NONFORM_PRC* and *TBF0_DRUG* tables will be examined for updated records.

3.1.3 Store Data

Specific store information is housed in the *TBF0_STORE* table. The following information will be replicated in the web database:

- STORE_NBR
- STORE_24_HOUR_IND
- PHRM_PHONE_AREA_CD
- PHRM_PHONE_NBR
- PHRM_FAX_AREA_CD
- PHRM_FAX_NBR
- STORE_MAILING_ADDR
- STORE_MAILING_CITY
- STORE_MAILING_STATE
- STORE_MAILING_ZIP
- TIME_ZONE_CD

In addition, the specific hours for a given store reside in the *TBF0_STORE_PHARM_HOURS* table. The following data will be replicated in the web database:

- MON_OPEN_TIME
- MON_CLOSE_TIME
- TUE_OPEN_TIME
- TUE_CLOSE_TIME
- WED_OPEN_TIME
- WED_CLOSE_TIME
- THU_OPEN_TIME
- THU_CLOSE_TIME
- FRI_OPEN_TIME
- FRI_CLOSE_TIME
- SAT_OPEN_TIME
- SAT_CLOSE_TIME
- SUN_OPEN_TIME
- SUN_CLOSE_TIME

Both of these data sets have an UPDATE_DTTM field that will be used to determine whether the associated data in that record has been updated. A Perl/DBI script, run daily as a UNIX Cron process, will check these fields in their respective tables. When this field has a value later

than that stored in the web database for the replicated record, that data will be update via a DB LINK.

3.2 *Medispan*

Medispan is a third party data set that provides drug information regarding prescription drugs to Pharmaceutical companies and Pharmacies.

3.2.1 Drug Data

There are four tables that comprise the Medispan data set. They are updated on quarterly basis. These tables contain drug information, drug active ingredients, generic product information, and a generic pricing reimbursement guide. The tables are *TBF0_MDDB_DRUG*, *TBF0_DRUG_INGRED*, *TBF0_MDDB_GPPC*, and *TBF0_MDDB_GPPC_PRICING* and will be replicated via database links in the web site database.

The database links will provide a virtual staging area from which a complete refresh of the local copy of the Medispan data can be completed. Initially, this refresh will done on a quarterly basis utilizing a Perl/DBI script scheduled via the standard UNIX Cron functionality. The update frequency is easily configurable should Walgreens decide that more frequent updates are desirable.

3.2.2 Drug Images

Medispan distributes drug images to Walgreens via CD-ROM. These images are indexed by their NDC number, encoded within the image name and stored in a common directory.

Currently, someone at Walgreens uses this CD to transfer the images to the existing web site via FTP. The Pharmacy web site will FTP these files into the application image directory.

4. ATG E-Commerce Station

The ATG system maintains an extensive set of attributes per registered user for the purposes of personalization. This section will address the Walgreens specific augmentations that are necessary to integrate the Pharmacy requirements into the ATG database schema. ATG integrates this separate DB schema via XML extensions maintained within the product.

4.1 Registration (User Profile)

The following demographic attributes will be integrated into the ATG database schema to support member registration:

- Login ID
- Password
- Password Hint
- PIN
- PIN/Password Lockout Flag
- Email Address
- Patient ID (From Intercom Plus)
- First Name
- Middle Initial
- Last Name
- Address
- City
- State
- Zip Code
- Area Code
- Phone Number
- Secondary Area Code
- Secondary Phone Number
- Birth Date
- Sex
- Preferred Walgreens Location
- Credit Card Type
- Credit Card Name (as it appears on the card)
- Credit Card Number
- Credit Card Expiration Date

- Billing Address (*)
- Billing City (*)
- Billing State (*)
- Billing Zip (*)
- Shipping Address
- Shipping City
- Shipping State
- Shipping Zip Code
- Easy Open Cap Preference
- Other Household Members (*) (Multiple)

This information is gathered from the registration form and stored in the **MEMBERS** table of the web database with the exception of the starred item, which are stored in detail tables with a master/detail relationship back to the **MEMBERS** table. The Billing address is only stored when it differs from the Mailing address.

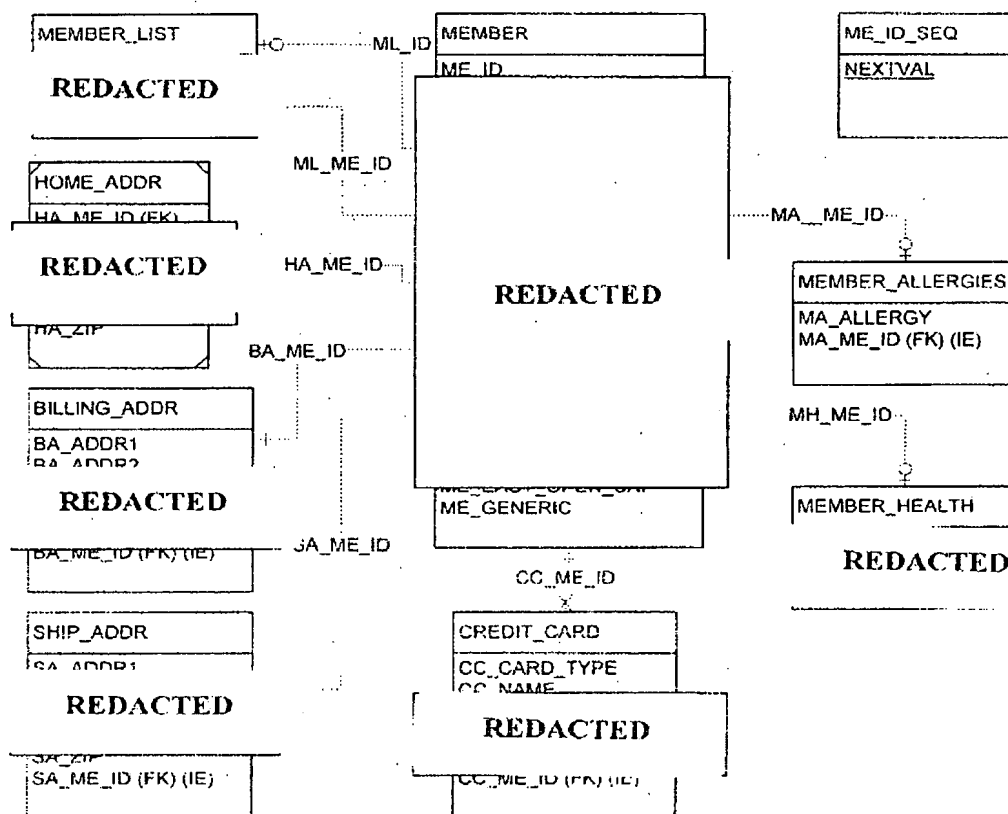


Figure 1. Member Profile Schema

The actual user experience during the registration process is detailed in the Registration Use Case, which can be found in Appendix A of the *Pharmacy Phase II: Electronic Commerce Infrastructure Specification*.

The Intercom Plus Patient ID is acquired the first time a registered member submits a pharmacy order. This acquisition is accomplished via the new matching screen used by the Customer Service Representatives at the Mail Order Facility. This is a one-time matching process that also updates the Intercom Plus record to reflect that this patient is an Internet customer.

This is a significant deviation from the original proposal defined in the Critical Path document that preceded this specification. In particular, the entire concept of householding has been abandoned and replaced with the concept that each member is an individual, loosely tied together through the use of the Member List. This mechanism allows users to define relationships between other users for quickly switching from one to another.

Also, the secondary password for prescription history access has been replaced with the concept of a one-time PIN, used to validate first-time access to the history.

4.1.1 Third Party Insurance

Third Party Insurance data is maintained within Intercom Plus in the **TBF0_THIRD_PARTY_PLAN** table, the **TBF0_PAT_THRD_PTY** table, and the Patient Profile. A member's third party plan affiliation will not be tracked in their Member Profile, but will be accessible from Intercom Plus through Tuxedo and a database link to the **TBF0_THIRD_PARTY_PLAN** table. In this case, the database link will be accessed real-time as a lookup facility for the third party plan description, using the third party plan ID as the key returned by the Tuxedo retrieval of the Patient Profile third party insurance data.

It will be the responsibility of Customer Service to administer the entry and update of this data within Intercom Plus, either as part of the new customer registration process or as a patient profile update for third party information, detailed elsewhere in the specification.

This is a much more streamlined approach to third party insurance management—significantly different from the approach defined in the Critical Path Document. As such, the Third Party Plan table has been removed and a greater emphasis is being placed on Customer Service to ensure that insurance plans are handled efficiently.

4.2 Product Catalog

Since the Walgreens Pharmacy does not need to fit the online store model, the concept of SKU numbering does not apply to the prescription drugs that will be offered via the Internet. In the case of the Online Pharmacy, the **DRUG_ID** field from the **TBF0_DRUG** table will be the Primary Key for the product data stored in the web database.

As described in the section 1.3.1.2, the following fields from **TBF0_DRUG** will be used to populate the **PRODUCT** table of the web database:

- **PRODUCT_NAME_ABBR**
- **DRUG_CLASS**
- **DRUG_STRENGTH**
- **DRUG_STRENGTH_UOM**

These fields, when concatenated, define the drug NDC number, which is the foreign key to the Medispan data:

- **NDC_MFG**
- **NDC_PROD**
- **NDC_PKG**

Since the **PRODUCT_NAME_ABBR** field contains additional data besides the actual drug name, Walgreens will need to supply a comma delimited, CSV type text file that can be applied to the database. This file will contain record pairs consisting of **DRUG_ID**, *drug display name*, Presumably generated from the **PRODUCT_NAME_ABBR** field.

The **UPDATE_DTTM** field, in conjunction with a database link to the **TBF0_DRUG** table, will be used to determine if information for a given drug has been updated. If this is the case, a local record will be updated to contain the current data. In order to automatically ensure that the drug data in the product data catalog is current, a Perl/DBI script will query the **TBF0_DRUG** table within Intercom Plus nightly and apply the appropriate data to the web database. The UNIX Cron facility will be utilized to schedule this process.

4.3 Order Data

It is a requirement that new mail order prescriptions and refills be tracked within the system. If these orders are lost in transit, an audit trail exists and the order can be re-submitted for fulfillment.

4.3.1 New Prescriptions Orders

As described elsewhere in the system specification, new prescription orders are entered as multi-line freeform text as drug name, drug strength, and drug quantity. In the case of mail order fulfillment for a previously "matched" customer, a blank Promise order header is opened via a Tuxedo request and the freeform data, along with the Promise order number, is stored in the database and forwarded to Customer Service for verification and line item entry into the Promise system. In the case of the unmatched customer, a Promise order number will not be available.

The following order data is stored the **DRUG_ORDER** and **DRUG_ORDER_DETAIL** tables for audit purposes in the web database:

- Order reference sequence number
- Promise Order Number (mail order only)
- Destination Store (store pickup orders only)
- Member ID
- Insurance or Self Pay Flag
- Requested Fill Date
- Prescribing Doctor's Name (*)
- Prescribing Doctor's Phone Number (*)
- Freeform Drug Text (*)
- Freeform Drug Strength Text (*)
- Drug Quantity (*)

The starred items indicate multiple occurrences in the **DRUG_ORDER_DETAIL** table.

4.3.2 Rx Refill Orders

For Rx Refill Orders, the customer need only enter the Rx number of the existing prescription. The Rx number will be stored in the **DRUG_ORDER** table for audit purposes, along with the member ID.

In the case of the first time web customer, an additional Tuxedo request is required using the Rx number, date of birth, and phone number to populate the patient ID in their member record.

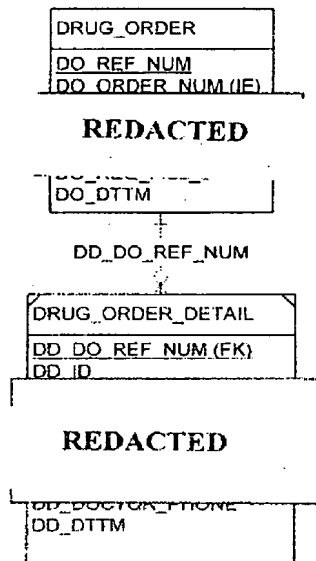


Figure 2. Prescription Order Schema

4.4 ***RX Refill Transfers***

Walgreens web customers will have the ability to transfer existing prescriptions from another pharmacy to Walgreens via the web site. The following data will be captured and forwarded to Customer Service for execution of the transfer:

- Pharmacy Name
- Pharmacy Phone Number
- Drug Name and Strength
- Existing RX Number
- Quantity
- Prescribing Doctor's Name
- Prescribing Doctor's Phone Number

4.5 ***Order Status***

Web customers will have the ability to check order status for all mail order prescriptions, both new prescriptions and refills. To support this functionality, the following data will be stored in the ***RX_ORDER_STATUS*** table of the web site database:

- Order Number
- Member ID
- Order Status
- Shipping Method
- Shipment Tracking Number
- Timestamp

The detail table, ***RX_ORDER_DETAIL***, contains the line item detail for the prescription order. The following data is stored in this table:

- Order Number
- Line Number
- Snap Cap Indicator
- Third Party Plan Name
- Third Party Plan Group ID
- Doctor's First Name
- Doctor's Middle Initial
- Doctor's Last Name
- Doctor's DEA Number
- Doctor's Phone Number

- Rx Number
- Drug Manufacturer
- Drug Name
- Drug Quantity
- Refills Remaining
- Patient's Cost
- Current NDC
- Original NDC

These tables are populated from the datafiles that are received via FTP from the Plus system twice daily.

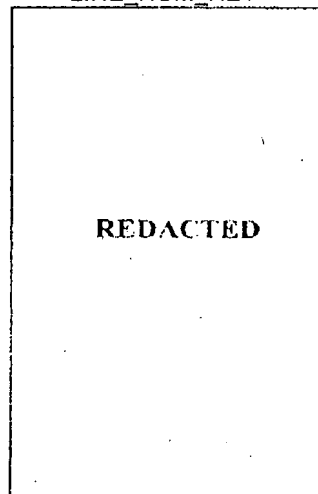
A Perl/DBI script invoked by the UNIX Cron facility is used to parse the records in these files and applies the header record data to the ***RX_ORDER_STATUS*** table and the script detail record data to the ***RX_ORDER_DETAIL***.

The header fields that will populate the ***RX_ORDER_STATUS*** table are.

- ORD_NUM_KEY (Order Number)
- PROMISE_ORD_STATUS
- PREF_SHIP_METH
- SHIP_TRACK_NUM

The script detail fields that will populate ***RX_ORDER_DETAIL*** table are:

- ORD_NUM_KEY
- LINE_NUM_KEY



- SCR_REMAIN_QTY (Refills remaining)
- SCR_COST

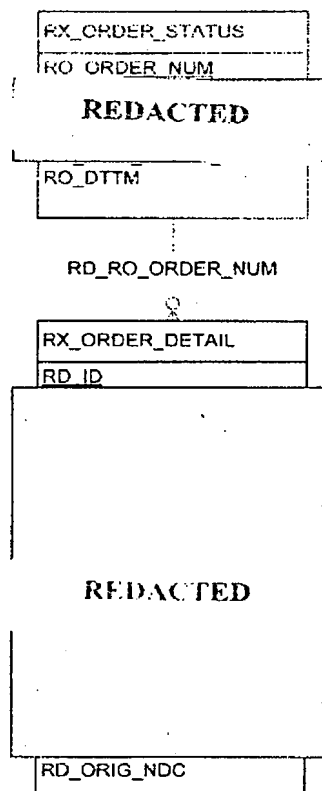


Figure 3. Order Status DB Schema

5. Store Locator

As referenced earlier, store data is replicated in the web database to support store locator functionality for both physical location identification and store routing functionality for prescription fulfillment. The **STORES** table resides in the web database and is populated via a DB link to the **TBF0_STORE** and **TBF0_STORE_SYNC** tables maintained in Intercom Plus. A UNIX Cron job will run nightly, checking **UPDATE_DTTM** in the **TBF0_STORE**, updating those records that are no longer synchronized and inserting new records that represent new stores.

A detail table, **STORE_HOURS**, is populated via a DB link to the **TBF0_STORE_HOURS** table. This table has an SQL trigger that executes on insert and update that determines whether or not the store hours for weekdays are identical. If the hours are identical, the **ST_WKDY_SAME** flag is set to true. This flag is only used when the system displays store hours. The same UNIX Cron job referenced above will run nightly to update the table data.

The following schema diagrams depicts the store information stored in the web database:

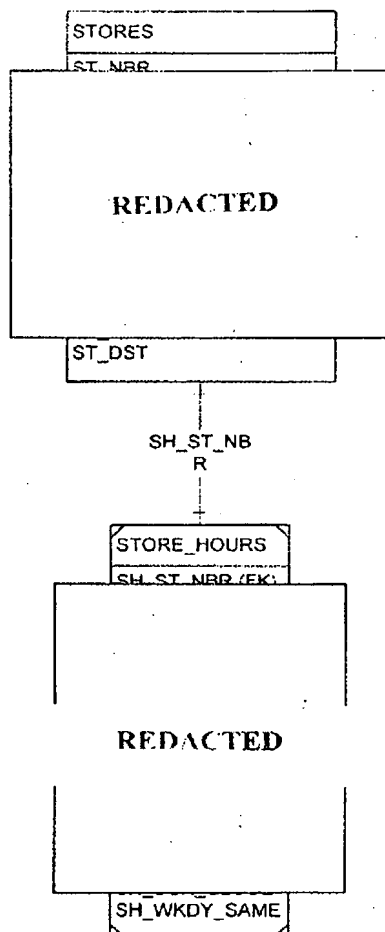


Figure 4. Store Info DB Schema Diagram

Appendix A. Table Definitions

The following is a detailed list of the database table definitions for the implementation of the Walgreens Online Pharmacy. These definitions are in addition to those tables defined within the ATG product:

WWW_Member Table

Attribute	Data Type	Comments
ME_ID	INTEGER	Unique Member ID
REDACTED		
ME_SEND_INFO	BOOLEAN	Send emails?

WWW_Member_List Table

Attribute	Data Type	Comments
ML_DISPLAY_NM	VARCHAR(255)	Name to display in the list
REDACTED		
ML_EMAIL	TEXT	Email address

WWW_Home_Addr Table

Attribute	Data Type	Comments
REDACTED		
HA_ZIP	VARCHAR(9)	Home Zip

WWW_Ship_Addr Table

Attribute	Data Type	Comments
SA_ME_ID	INTEGER	Foreign Key to Members Tbl
REDACTED		
SHIP_ZIP	VARCHAR(9)	Shipping Zip

WWW_Billing_Addr Table

Attribute	Data Type	Comments
REDACTED		

WWW_Member_Health Table

Attribute	Data Type	Comments
HL_ME_ID		Foreign Key to Members Tbl
REDACTED		

WWW_Member_Allergies Table

Attribute	Data Type	Comments
ALL_ME_ID		Foreign Key to Members Tbl
REDACTED		

WWW_Credit_Card Table

Attribute	Data Type	Comments
REDACTED		
CC_ME_ID	INTEGER	Foreign Key to members ID

WWW_RX_Order Table

Attribute	Data Type	Comments
RO_REF_NUM	INTEGER	Internal Reference Number
REDACTED		

WWW_RX_Order_Detail Table

Attribute	Data Type	Comments
RD_ORD_REF_NUM	INTEGER	Foreign key to Drug_Order_Tbl
REDACTED		
RD_DTTM	DATE	Timestamp

WWW_RX_Order_Status Table

Attribute	Data Type	Comments
RS_ORDER_NUM	INTEGER	Foreign key to Drug_Order_Tbl
REDACTED		
RS_DTTM	DATE	Timestamp

WWW_RX_Order_Status_Detail Table

Attribute	Data Type	Comments
RX_LINE_NUM	INTEGER	Line number from Promise
REDACTED		
RX_RS_ORDER_NUM	CHAR(7)	FK to RX_ORDER_STATUS

WWW_RX_Transfer Table

Attribute	Data Type	Comments
PRES_ID	INTEGER	Prescription Key to Membership Table
REDACTED		
PHYSICIAN_PHONE	VARCHAR(15)	Prescribing doctor's phone

WWW_Stores Table

Attribute	Data Type	Comments
ST_NUM	INTEGER	Store Number
REDACTED		
LONGITUDE	CHAR(9)	Store Longitude

WWW_Store_Hours Table

Attribute	Data Type	Comments
SH_ST_NUM	INTEGER	Foreign Key to StoresTbl
REDACTED		

WWW_Product Table

Attribute	Data Type	Comments
PR_DRUG_ID	INTEGER	Product ID - TBF0 DRUG
REDACTED		

WWW_Product_Qty Table

Attribute	Data Type	Comments
PR_ID	INTEGER	Product ID
REDACTED		
PR_QTY	NUMBER(8,2)	Price for this quantity